REMARKS

This paper is being provided in response to the Final Office Action dated October 18, 2006, for the above-referenced application. Applicant has provided herewith a listing of the pending claims but have not amended the claims herein. Applicant respectfully requests consideration of the following remarks.

The rejection of claims 63, 66-80 and 83-96 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,324,654 to Wahl et al. (hereinafter "Wahl") in view of U.S. Patent No. 4,665,520 to Strom, et al. (hereinafter "Strom") is hereby traversed and reconsideration thereof is respectfully requested.

Independent claim 63 recites a method for performing data recovery in a computer system that includes sending data from a first storage device to at least one other secondary storage device, the data being sent in a plurality of data packets, each of the plurality of packets being associated with a sequence number having a first predetermined value, upon determining that the data has been successfully stored on all of the at least one other storage device, deleting journal entries in a sender corresponding to the data and, upon determining a failure in connection with synchronizing data between a first storage device and at least one other secondary storage device, deleting journal entries in each of the at least one other secondary storage device, and resending unsynchronized journal entries from the sender by sending a plurality of data packets all having a same sequence number lower than sequence numbers associated with other unsent packets and then sending any remaining data packets having a next higher sequence number, where data packets having the same sequence number are sent in an

order that is independent of an order in which the data packets were created and wherein data packets having the same sequence number represent different data that is independently generated from a plurality of different sources. Claims 66-79 depend, directly or indirectly, from independent claim 63.

Independent claim 80 recites a computer program product for performing data recovery in a computer system that includes machine executable code that sends data from a first storage device to at least one other secondary storage device, the data being sent in a plurality of data packets, each of the plurality of packets being associated with a sequence number having a first predetermined value, machine executable code that, upon determining that the data has been successfully stored on all of the at least one other storage device, deletes journal entries in a sender corresponding to the data, and machine executable code that, upon determining a failure in connection with synchronizing data between a first storage device and at least one other secondary storage device, deletes journal entries in each of the at least one other secondary storage device, and resends unsynchronized journal entries from the sender by sending a plurality of data packets all having a same sequence number lower than sequence numbers associated with other unsent packets and then sending any remaining data packets having a next higher sequence number, where data packets having the same sequence number are sent in an order that is independent of an order in which the data packets were created and wherein data packets having the same sequence number represent different data that is independently generated from a plurality of different sources. Claims 83-96 depend, directly or indirectly, from claim 80.

The Wahl reference discloses a computer network remote data mirroring system that writes update data both to a local data device (16) and to a local, chronologically sequenced journal storage area (18). If the local computer system crashes, upon recovery or re-boot of the local computer system, the two most current updates from the journal storage area (18) device are written to the local data device (16) to assure that the data stored on the local data device is current. Figure 2 shows that the journal storage area (18) may be organized as a circular queue. Column 7, lines 18-22 disclose that each entry written to the journal storage area (18) consists of data and a header where the header contains information, such as a timestamp, sequence number, device offset, and size of the transaction that is used by other system components. Column 9, lines 32-37 of Wahl disclose that the header contains, *inter alia*, a global sequence number (unique between all journal devices) and a local sequence number (unique within a current journal device) and that the sequence numbers are used to ensure that the order of the data entries in the journal storage area (18) exactly follows the sequence in which they are generated. As indicated in the Office Action, Wahl does not teach sending a plurality of data packets all having a same sequence number lower than sequence numbers associated with other unsent packets and then sending any remaining data packets having a next higher sequence number, wherein data packets having the same sequence number are sent in an order that is independent of an order in which the data packets were created and wherein data packets having the same sequence number represent different data.

The Strom reference discloses a technique of optimistic recovery in a distributed system. The Office Action cites Strom as disclosing messages that are independently generated from

different sources are stored in a recovery unit in the case of transmission failure and are resent in an order that is based on ordinal numbers, incantation numbers and message dependencies.

Applicant's presently-claimed invention includes features for a data recovery system wherein *a plurality of data packets having a same sequence number are sent in an order that is independent of an order in which the data packets were created and wherein data packets having the same sequence number represent different data generated by a plurality of different sources.* This feature is described in the present application and illustrated, for example, by Figures 8 and 9 and the corresponding description on pages 20-22 of the originally-filed specification. Data packets from two independent chains may be assigned the same sequence number and written to the secondary storage device in any order. Thus, for recovery operations (e.g., the step 306 of Figure 16), the data corresponding to the same sequence number may be provided in an order that is independent of an order in which the data packets were created, as recited in Applicant's independent claims. The data packets represent different data from different sources, not the same data retransmitted (see, for example, page 20, lines 3-13 of the originally-filed specification).

The Office Action cites to Strom as disclosing the above-noted features as claimed by Applicant. In particular, the Office Action cites, for example, to col. 14, lines 1-44 of Strom at which is disclosed use of session sequence numbers in the event of a message transmission failure. Here, Strom discloses the identification of each message with two numbers: (1) an ordinal number indicating the relative position of the message or state interval in the stream

thereof, and (2) an incarnation number representing the number of times a recovery unit has rolled back and replayed messages. As stated by Strom:

> If the system proceeds without failure or rollback, the incarnation number remains the same and only the ordinal number changes. If failure or crash occurs, the incarnation number increments for messages after rollback has occurred. That is, for messages that are re-played, the pre-rollback incarnation number still applied. For messages continuing after the message rolled back to, an incremented incarnation number applies. (Col. 14, lines 10-18 of Strom).

That is, Strom discloses that, in the event of a failure, the system is rolled back to a state before the failure, and messages are then re-played based on pre-rollback numbers in the same order as previously received for processing. (See, for example, col. 13, lines 56-62 of Strom.)

Strom goes on to describe a sending recovery unit and a receiving recovery unit that, respectively, send and receive messages, in the case of transmission failure, in the recovery process in which the sending recovery unit resends messages "starting with the message corresponding to the session sequence number expected by the receiving recovery unit" (see col. 14, lines 40-41 of Strom.) Accordingly, even through Strom discloses the sending and receiving of messages that are independently generated from various sources, Strom does not disclose a data synchronization process involving the creation of messages having the same sequence number but representing different data that are independently generated from a plurality of different sources, as is claimed by Applicant. That is, Strom discloses a message recovery system in the event of a failure to transmit a message in which each message has a specific session sequence number (see, for example, col. 12, lines 28-31 of Strom) that is expected by the receiving recovery unit, and the specific session sequence number is utilized by the sending recovery unit to re-send the message if it is determined that the message has not been correctly received. Thus, each different message is each associated with a specific session sequence

number that identifies the specific message (see, for example, col. 12, lines 39-48 of Strom) and which allows for retransmission of the specific message.

Accordingly, Applicant submits that neither Wahl nor Strom, taken alone or in combination, teach or fairly suggest at least the features of a data recovery system in which, in the event of a failure concerning data synchronization, data packets having the same sequence number are sent in an order that is independent of an order in which the data packets were created and wherein data packets having the same sequence number represent different data that is independently generated from a plurality of different sources. In view of the above, Applicant respectfully requests that this rejection be withdrawn.

Based on the above, applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 508-898-8603.

Respectfully submitted,
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